

## Case Study

## 10

## RDM in the Performing Arts: Living Symphonies by Daniel Jones & James Bulley (Unit for Sound Practice Research, Goldsmiths, University of London)

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### 10.1. INTRODUCTION

*Living Symphonies*<sup>1</sup> is a landscape sound installation by James Bulley and Daniel Jones<sup>2</sup>, which toured across four different forests<sup>3</sup> in the UK in the summer of 2014. The work portrays the thriving activity of the forest's wildlife, plants and atmospheric conditions, creating an ever-changing sound symphony heard from a network of 24 speakers hidden throughout the forest itself. Working with ecologists and wildlife experts across the UK, Jones/Bulley developed highly detailed maps of the flora and fauna that inhabited each forest site where the installation was to take place.

Each species in the surveyed area was depicted by a unique set of musical motifs that portrayed their changing behaviour over day and night, coming to life as the species awakened; moving, developing and interacting just as the organism would. Dozens of these motifs were heard at any moment when the piece was live, spatialised across the space of the forest and heard back through a three-dimensional speaker system. In total there were some 15,000 fragments of sound within the sound score, making up musical movements for over a hundred different organisms.

### 10.2. FUNDER REQUIREMENTS

The piece was commissioned and funded as a collaborative work by Sound and Music, the Arts Council England and the Forestry Commission England. All copyright in the work, including that of the datasets, remained with the artists and there was no requirement to make any such data publicly available. A required outcome was a toolkit for touring public artworks, produced and published by the Forestry Commission England. This toolkit is openly accessible and available here<sup>4</sup>.

### 10.3. SURVEY DATA

In order to undertake the piece, the artists collected a large array of datasets over a year-long period of in-depth research and development. This data was used both to create and contextualize the artwork. A table of datasets captured during the project is shown in Figure 10.1.

<sup>1</sup> Living symphonies: <http://www.livingsymphonies.com>; last accessed 5 March 2017.

<sup>2</sup> James Bulley (b. 1984) and Daniel Jones (b. 1983) are an artist duo whose collaborative practice explores the boundaries of sound art, music, and process-based composition: <http://jones-bulley.com/biography/>; last accessed 5 March 2017.

<sup>3</sup> The forest sites for the 2014 tour were as follows; Thetford Forest (24–30 May 2014), Fineshade Woods (20–26 June 2014), Cannock Chase (26 July–1 August 2014), and Bedgebury Pinetum (26 August–7 September 2014).

<sup>4</sup> Sound and Music: <http://soundandmusic.org/create/planningandproducingartworksinthetnaturalenvironmenttoolkit>; last accessed 5 March 2017.

| Type of dataset   | Format  | Size   | Capture Tools/<br>Software  | Backup/Storage                                       | Raw | Prepared   | Shared with   | Archived               | Accessible    |
|---|---|--------|---|--|-----|--|---|------------------------|---------------|
| Detailed ecological surveys of four forest sites captured by teams of volunteers.   | .xls / .csv   | 20 Mb  | Google Docs / iPad  | Google Drive / download onto Dropbox < > hard drives | Yes | No   | Internal  | Yes - onto hard drives | Not currently |
| Photographic surveys of the four forest sites (each metre square of the 30x20m forest sites), used for survey reference and as documentation  | .tiff / .jpeg   | 30 Gb  | Canon 6D DSLR camera / Photoshop  | Dropbox < > hard drives                              | Yes | Yes as collage images of each site                           | Internal mainly (but some on website / used for press)              | Yes - onto hard drives | Not currently |
| Illustrations of selected organisms by the artist Katie Scott. This material was used in visual explanations for the audience and in various marketing materials.                                     | .tiff / .eps  | 400Mb  | Adobe Illustrator / Hand drawn  | Dropbox < > hard drives                              | Yes | Yes<br><br>print versions etc available                      | Internal mainly (but some on website / used for press)              | Yes - onto hard drives | Not currently |
| Reference field recordings of the four forest sites. These recordings were used to identify bird song and animal calls, and as an aid in balancing the sound mix of the piece.                        | .wav  | 30 Gb  | Zoom H6, Tascam P2, DPA4060 Microphones / Pro Tools   | Dropbox < > hard drives                              | Yes | Yes (edited selection available for use)                     | Internal only   | Yes - onto hard drives | Not currently |
| Site and development documentation, across the four sites. This material was used as a documentation of the process of the creation of the piece for future papers and presentations about the piece. | HD film in .mov format and HR photography in .tiff format       | 10 Gb  | Canon 6D DSLR camera / Photoshop  | Dropbox < > hard drives                              | Yes | Yes (edited selection available for use)                     | Internal mainly (but some on website / used for documentation film) | Yes - onto hard drives | Not currently |
| Recordings of the scored musical fragments that make up the piece, derived from sessions with over 50 musicians in studios across the UK.   | .wav / Pro Tools sessions (.pts) / Ableton Live sessions (.als) | 150 Gb | Numerous microphones. Recorded into Pro Tools (.pts) as .wav files and then worked in Ableton Live (.als) | Dropbox < > hard drives                              | Yes | Yes (but only for use within the master score for the piece) | Internal only   | Yes - onto hard drives | Not currently |
| 3D software simulations of the forest sites created from the survey data  | software package - python, C++, MaxForLive                      | 500Mb  | Custom software   | Dropbox < > hard drives                              | Yes | /  | Internal only   | Yes - onto hard drives | Not currently |

Figure 10.1 Table of datasets

10.4. BACKUP AND STORAGE

Working in remote forests across England was a challenge for capturing and storing data, as Internet/ network access was extremely limited. As a result, the data was regularly backed up and duplicated onto hard drive storage, before then being synchronized to cloud storage at a later point. For immediate ‘transfer’ purposes all data gathered was placed into Dropbox (for sharing with partners including press organisations, Sound and Music and Forestry Commission England) and then transferred to external hard drive storage (copies were synced and held both at the Jones/Bulley studio and in personal artist studios offsite). Dropbox was used for its ease of use, stability and simple sharing interface.

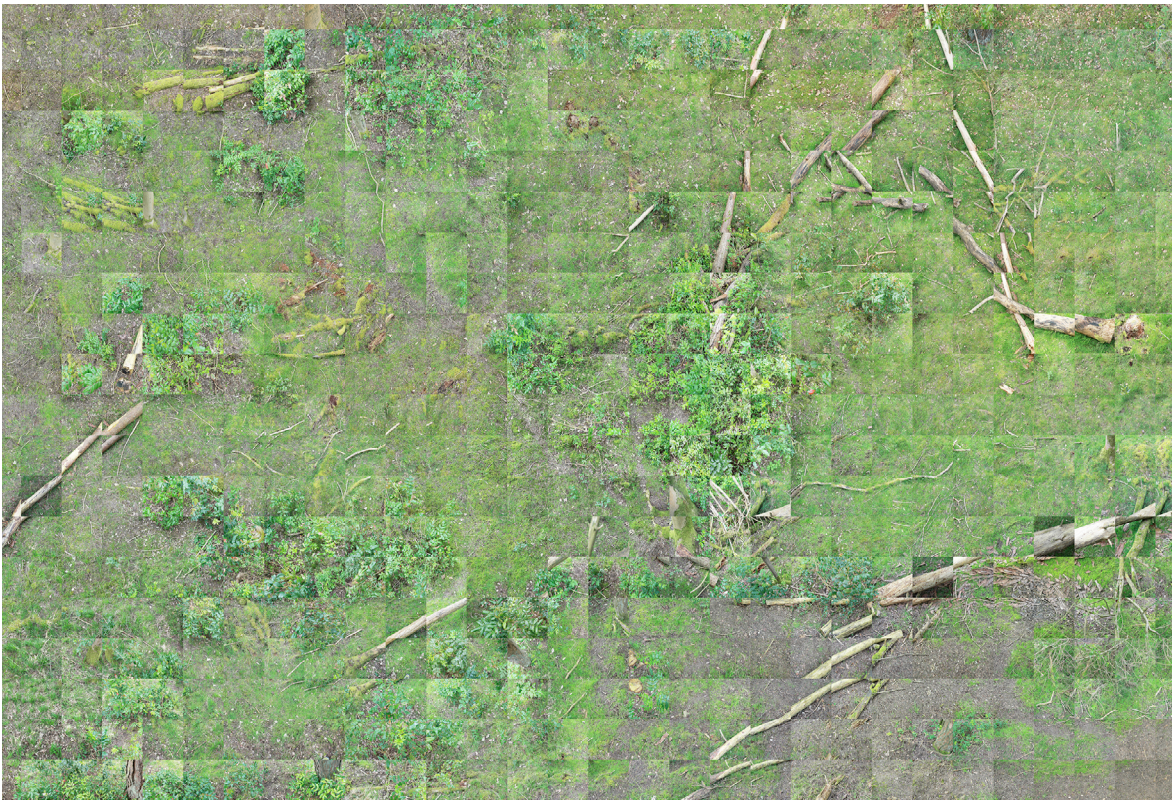


Figure 10.2 Thetford Forest Photographic Survey, 2014 (Photograph: James Bulley)

10.5. ANCILLARY DATA

During the live period as the installation toured, there were a number of additional datasets that were captured by the artists and the production team as part of the project.

A table of datasets captured during the project is included in Figure 10.3

| Type of dataset  | Format                    | Size  | Capture Tools/ Software   | Backup/ Storage  | Raw | Prepared  | Shared with                         | Archived               | Accessible    |
|--|---------------------------|-------|---|--|-----|---|-------------------------------------|------------------------|---------------|
| Written testimonials (blogposts, handwritten feedback forms regarding audience experience) | .doc / paper              | 5Mb   | Journal articles / written testimonies on paper   | Dropbox < > Hard disks / physical backup in studio boxes | Yes | Yes   | Some public, some internal only     | Yes - onto hard drives | Not currently |
| Press articles and coverage (BBC news, Nature Journal video feature, Guardian feature etc) | .pdf captures             | 3Gb   | Paparazzi .pdf screen capture software / print to .pdf function on Google Chrome. Videos as downloads (or sent in links from producers) | Dropbox < > Hard disks                                   | Yes | Yes   | Internal only                       | Yes - onto hard drives | Not currently |
| Video documentation of the sites (both with and without audience presence)                 | .mov HR files             | 150Gb | Canon 6D DSLR camera  | Dropbox < > Hard disks                                   | Yes | No  | Internal only (possible future use) | Yes - onto hard drives | Not currently |
| Audio documentation of the piece live at each site   | .wav files                | 50Gb  | recorded on ZoomH6 with DPA4060 microphones (and various others)  | Dropbox < > Hard disks                                   | Yes | Yes (edited highlights selected and used on video documentation)      | Internal only (possible future use) | Yes - onto hard drives | Not currently |
| Photographic documentation of the piece and the forest sites                               | .tiff files / .jpeg files | 10Gb  | Canon 6D DSLR camera  | Dropbox < > Hard disks                                   | Yes | Yes (edited highlights package created for press use and website use) | Internal only (possible future use) | Yes - onto hard drives | Not currently |
| Captures of the weather data   | .csv files / .xls files   | 20Mb  | Weather station through custom software   | Dropbox < > Hard disks                                   | Yes | No  | Internal only                       | Yes - onto hard drives | Not currently |

Figure 10.3 Table of ancillary datasets

| Class   | Behaviour Group | Family     | Code | Abreviation | Species                   | Latin name                | Scientific Family | Scientific Genus | Dominance | Radius | Length [1] | Wingspan | Speed [2]                        | Activity Pattern            | Weather  | Social Behaviour [3] | Food Sources                                     | Flowers |
|---------|-----------------|------------|------|-------------|---------------------------|---------------------------|-------------------|------------------|-----------|--------|------------|----------|----------------------------------|-----------------------------|--|----------------------|--|---------|
| Mammal  | Individual      | Deer       | M.01 |             | Roe Deer                  | Capreolus capreolus       | Cervidae          | Capreolus        | 5         | 8      | 120        |          | 0.42 [4]                         | crepuscular, nocturnal      |  | social (4)           | grass, leaves, berries, ivy, hawthorn            |         |
|         |                 |            |      |             | Fallow Deer               | Dama dama                 | Cervidae          | Dama             |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Reeves' Muntjac           | Muntiacus reevesi         | Cervidae          | Muntiacus        |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Red Deer                  | Cervus elaphus            | Cervidae          | Cervus           |           |        |            |          |                                  |                             |  |                      |  |         |
| Mammal  | Individual      | Fox        | M.02 |             | Red Fox                   | Vulpes vulpes             | Canidae           | Vulpes           | 4         | 8      | 70         |          | 0.5                              | nocturnal, crepuscular      |  | territorial          | mammals, birds, berries, nuts, worm              |         |
| Mammal  | Individual      | Rabbit     | M.03 |             | European Rabbit           | Oryctolagus cuniculus     | Leporidae         | Oryctolagus      | 3         | 8      | 38         |          | 3 [5]                            | nocturnal, crepuscular      |  | solitary             | grass  |         |
| Mammal  | Individual      | Hare       | M.04 |             | European Brown Hare       | Lepus europaeus           | Leporidae         | Lepus            | 3         | 8      | 60         |          | 4                                | nocturnal, crepuscular [6]  |  | solitary             | grass, berries, moss                             |         |
| Mammal  | Individual      | Badger     | M.05 |             | European Badger           | Meles meles               | Mustelidae        | Meles            | 4         | 8      | 75         |          | 0.25                             | nocturnal, crepuscular      |  | social (8)           | worm, mammals, insects, reptiles, birds, berries |         |
| Mammal  | Individual      | Weasel     | M.06 |             | Least Weasel              | Mustela erminea           | Mustelidae        | Mustela          | 3         | 8      | 20         |          | 1.7 [7]                          | continuous                  |  | territorial          | vole, mouse, frog                                |         |
| Mammal  | Individual      | Mouse      | M.07 |             | Woodmouse                 | Apodemus sylvaticus       | Muridae           | Apodemus         | 2         | 8      | 9          |          | 0.9 [8]                          | nocturnal [9]               | less active when cold/wet  | solitary             | seeds, berries, insects, worms, snails, fungus   |         |
| Mammal  | Individual      | Shrew      | M.08 |             | Common Shrew              | Sorex araneus             | Soricidae         | Sorex            | 2         | 8      | 7          |          | 0.9 [10]                         | continuous [11]             |  | territorial [12]     | snail, spider, worm, frog, mouse, vole           |         |
| Mammal  | Individual      | Vole       | M.09 |             | Field Vole                | Microtus agrestis         | Cricetidae        | Microtus         | 2         | 8      | 11         |          | 0.9                              | crepuscular, nocturnal [13] |  | solitary             | grass  |         |
| Mammal  | Individual      | Mole       | M.10 |             | European Mole             | Talpa europaea            | Talpidae          | Talpa            | 3         | 8      | 14         |          | 0.9                              | continuous                  |  | territorial          | worm, nuts                                       |         |
| Mammal  | Individual      | Squirrel   | M.11 |             | Grey Squirrel             | Sciurus carolinensis      | Sciuridae         | Sciurus          | 3         | 8      | 21         |          | 2.5 [14]                         | diurnal [15]                |  | solitary             | seeds, nuts, berries, fungus, bark               |         |
| Mammal  | Individual      | Hedgehog   | M.12 |             | European Hedgehog         | Eriacus europaeus         | Eriacidae         | Eriacus          | 3         | 8      | 20         |          | 0.05 [16]                        | nocturnal                   |  | solitary             | beetle, worm, snail                              |         |
| Mammal  | Individual      | Bat        | M.13 |             | Brown Long-eared Bat      | Plecotus auritus          | Vespertilionidae  | Plecotus         | 4         | 8      | 40         |          | 5 [17]                           | nocturnal [18]              |  | social (4)           | fly, moth  |         |
|         |                 |            |      |             | Common Pipistrelle        | Pipistrellus pipistrellus | Vespertilionidae  | Pipistrellus     |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Soprano Pipistrelle       | Pipistrellus pygmaeus     | Vespertilionidae  | Pipistrellus     |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Daubenton's Bat           | Myotis daubentonii        | Vespertilionidae  | Myotis           |           |        |            |          |                                  |                             |  |                      |  |         |
| Reptile | Individual      | Lizard     | R.01 |             | Common Lizard             | Lacerta vivipera          | Lacertidae        | Lacerta          | 2         | 8      | 10         |          | 0.2 (move in bursts of 0.5-1.5s) | diurnal                     | bask in sun; speed and pause duration change logarithmically below 25C (0.01@5C - 0.2@25C; 0.4@30C - 0.1@35C) [19] | solitary             | insects  |         |
| Reptile | Individual      | Snake      | R.02 |             | Grass Snake               | Natrix natrix             | Colubridae        | Natrix           | 3         | 8      | 80         |          | 0.5                              | diurnal                     | bask in sun; speed 0.25 m/s @ 15C - 0.45m/s @ 30C  | solitary             | reptiles, mouse, vole, shrew                     |         |
| Reptile | Individual      | Slow Worm  | R.03 |             | Slow Worm                 | Anguis fragilis           | Anguillidae       | Anguis           | 2         | 8      | 35         |          | slow moving unless startled      | diurnal                     | bask in sun  | solitary             | worm, spider, insects, snail                     |         |
| Reptile | Individual      | Frog       | R.04 |             | Smooth Newt               | Amphibia                  | Salamandridae     | Lissokriton      | 2         | 8      | 8          |          |                                  | nocturnal [20]              | diurnal during wet weather   | solitary             | snail, spider, insects                           |         |
|         |                 |            |      |             | European Common Frog      | Rana temporaria           | Ranidae           | Rana             |           |        |            |          |                                  |                             |  |                      |  |         |
| Bird    | Individual      | Wren       | B.01 |             | Wren                      | Troglodytes troglodytes   | Certhiidae        |                  | 2         | 8      | 10         | 15       | 6.5 [21]                         | diurnal                     |  | solitary             | insects  |         |
| Bird    | Individual      | Robin      | B.02 |             | Robin                     | Erithacus rubecula        | Muscicapidae      |                  | 2         | 8      | 14         | 21       | 11                               | diurnal                     |  | solitary             | insects, worm [22]                               |         |
| Bird    | Individual      | Finch      | B.03 |             | Bullfinch                 | Pyrrhuloxia pyrrhuloxia   | Fringillidae      |                  | 2         | 8      | 15         | 26       | 11                               | diurnal                     |  | territorial          | insects, seeds                                   |         |
|         |                 |            |      |             | Chaffinch                 | Fringilla coelestis       | Fringillidae      |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Goldfinch                 | Carduelis carduelis       | Fringillidae      |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Hawfinch                  | Caprimulgus vociferans    | Fringillidae      |                  |           |        |            |          |                                  |                             |  |                      |  |         |
| Bird    | Individual      | Tit        | B.04 |             | Crossbill                 | Alcedo atthis             | Alcedinidae       |                  | 2         | 8      | 12         | 22       | 8                                | diurnal                     |  | social               | insects, spiders                                 |         |
|         |                 |            |      |             | Great Tit                 | Parus major               | Paridae           |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Blue Tit                  | Parus caeruleus           | Paridae           |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Long-tailed Tit           | Aegolius funereus         | Paridae           |                  |           |        |            |          |                                  |                             |  |                      |  |         |
| Bird    | Individual      | Goldcrest  | B.05 |             | Goldcrest                 | Regulus regulus           | Regulidae         |                  | 2         | 8      | 9          | 15       | 6.5                              | diurnal                     |  |                      | insects, spiders                                 |         |
| Bird    | Individual      | Thrush     | B.06 |             | Song Thrush               | Turdus philomelos         | Turdidae          |                  | 2         | 8      | 23         | 36       | 11 [23]                          | diurnal                     |  |                      | insects, worms, spiders, seeds                   |         |
| Bird    | Individual      | Nighthawk  | B.07 |             | European Nighthawk        | Caprimulgus europaeus     | Caprimulgidae     |                  | 3         | 8      | 26         | 60       |                                  | crepuscular, nocturnal [24] | prefer warm, dry, still nights   |                      | moth, fly, dragonfly                             |         |
| Bird    | Individual      | Warbler    | B.08 |             | Blackcap                  | Sylvia atricapilla        | Sylviidae         |                  | 2         | 8      | 11         | 19       |                                  | diurnal                     |  |                      | insects, berries                                 |         |
|         |                 |            |      |             | White Throat Warbler      | Sylvia communis           | Sylviidae         |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Garden Warbler            | Sylvia hortensis          | Sylviidae         |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Willow Warbler            | Sylvia naumanni           | Sylviidae         |                  |           |        |            |          |                                  |                             |  |                      |  |         |
| Bird    | Individual      | Dove       | B.09 |             | Stock Dove                | Columba oenas             | Columbidae        |                  | 2         | 8      | 40         | 70       |                                  | diurnal                     |  | gregarious           | berries, nuts, seeds, insects                    |         |
| Bird    | Individual      | Woodpecker | B.10 |             | Wood Pigeon               | Columba palumbus          | Columbidae        |                  | 3         | 8      | 24         | 40       |                                  | diurnal [25]                |  | solitary             | ants, nuts, seeds, berries, leaves               |         |
|         |                 |            |      |             | Green Woodpecker          | Picus viridis             | Picidae           |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Great Spotted Woodpecker  | Picus major               | Picidae           |                  |           |        |            |          |                                  |                             |  |                      |  |         |
|         |                 |            |      |             | Lesser Spotted Woodpecker | Picus hypoleucos          | Picidae           |                  |           |        |            |          |                                  |                             |  |                      |  |         |
| Bird    | Individual      | Magpie     | B.11 |             | Jay                       | Corvus corax              | Corvidae          |                  | 2         | 8      | 40         | 60       |                                  | diurnal                     |  |                      | insects, mouse, vole, shrew, berries, nuts       |         |
| Bird    | Individual      | Cuckoo     | B.12 |             | Magpie                    | Corvus corax              | Corvidae          |                  | 2         | 8      | 40         | 60       |                                  | diurnal                     |  |                      | insects, mouse, vole, shrew, berries, nuts       |         |
| Bird    | Individual      | Rook       | B.13 |             | Cuckoo                    | Cuculus canorus           | Cuculidae         |                  | 3         | 8      | 32         | 58       |                                  | diurnal                     |  |                      | spider, beetle, moth, butterfly, insects         |         |
| Bird    | Individual      | Jackdaw    | B.14 |             | Rook                      | Corvus frugilegus         | Corvidae          |                  | 3         | 8      | 45         | 80       |                                  | diurnal                     |  |                      | worms, insects, seeds                            |         |
| Bird    | Individual      | Crow       | B.15 |             | Jackdaw                   | Corvus monedula           | Corvidae          |                  | 3         | 8      | 33         | 70       |                                  | diurnal                     |  |                      | insects, worm, mouse, berries                    |         |
| Bird    | Individual      | Pheasant   | B.16 |             | Crow                      | Corvus corone             | Corvidae          |                  | 3         | 8      | 46         | 100      |                                  | diurnal                     |  |                      | insects, worms, mouse, vole, berries             |         |
| Bird    | Individual      | Pheasant   | B.16 |             | Golden Pheasant           | Phasianus torquatus       | Phasianidae       |                  | 3         | 8      | 30         | 85       |                                  | diurnal                     |  |                      | seeds, berries, leaves, insects                  |         |

10.4 Excerpt from Living Symphonies full organism survey, 2014



| Flowers | Berries | Nuts | Thetford | Fineshade | Cannock | Bedgebury | Composition Notes           | Instrumentation   | Composition description   | Players   | Tone Row                      | Hz           | Root BPM | BPM range | Metre |
|---------|---------|------|----------|-----------|---------|-----------|-----------------------------|---|---|---|-------------------------------|--------------|----------|-----------|-------|
|         |         |      | 3        | 1         |         |           |                             | Trombone, Timpani   | French Horn prepared techniques, dynamic, interlocking patterns with timpani - opening of Javanese's Sidoran?   | Hywel Jones, James Bulley                                     | [Bb], C, D, Eb, F, G, A       | 87.3-1000    | 105      | 95-115    | 3/4   |
|         |         |      | 3        |           | 3       | 2         |                             | Euphonium   | clarinet melodies - rhythmic, complex not obvious, jump structure. trumpet avoids of prepared technique imbric material in harmony. trombone low soft rhythmic notes underlay   | Hywel Jones   | [F], G, A, Bb, C, D, Eb, E    | 140-1900     | 110      | 100-120   | 4/4   |
|         |         |      | 3        |           | 3       | 1         |                             | Euphonium (extended techniques)   | Euphonium - related interlocking patterns of slide sounds on 1st, 3rd then 4th... 'melody' from breath sounds on long drawn out high lead notes (top end of range) /  | Hywel Jones   | [D], E, F, G, A, Bb, C        | 140-1300     | 115      | 105-125   | 3/4   |
|         |         |      | 3        |           |         |           |                             | Female Voice, Alto  | triple, counter rhythms, leaping parts, glissando   | Hanna Basto, Laurel Sills                                     | [A], B, C, D, E, F, F#, G, G# | 164-680      | 70       | 60-80     | 4/4   |
|         |         |      | 3        |           | 2       | 3         |                             | 5-part male voice choir with off-beat persuasive rhythms and tambourine                 | Irish rhythm, punctuations by clap, lunch winding eastern sounding grouped voice melody, fast counterpoints, 5/7 above variations etc. tambourine to add to clap over time, shaker to add to percussion over time also              | Milo Fitzpatrick (D.Bass), Tenor Voices, Rosie Bergoni, JBDJJ | [G], Bb, A, C, D, F           | 50-1200      | 90       | 80-100    | 5/4   |
|         |         |      | 3        |           | 1       | 3         |                             | Alto Clarinet   | Glissando, leaping clarinet   | Charly Richardson   | [F], G, Ab, Bb, C, D, E       | 800-5,000    | 110      | 100-120   | 4/4   |
|         |         |      | 3        |           | 1       | 3         |                             | Extended percussive improvised fragments using the keys of the clarinet                 | filtered to be fairly high frequency... rhythmic  | Charly Richardson   | Non-tonal                     | 1200+        | 95       | 85-105    | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Piano prepared  | Short, punctuated fragments of high pitched sound, glimmering, sharp  | Keir studio - Prepared piano - Keir Vine                      | ?                             | 1200+        | 117      | 117       | 3/4   |
|         |         |      | 3        |           | 2       | 2         |                             | Prepared Chimes, Prepared Piano, metallophone   | Short, punctuated fragments of high pitched sound, glimmering, sharp  | Keir Vine   | Non-tonal                     | 1200+        | 110      | 100-120   | 4/4   |
|         |         |      | 3        |           | 3       | 1         |                             | Hang and Steel Drum chords and rhythms  | Chance based rhythms, with underlay of prepared sustained textures and pad (from contact mic scrape material)   | Keir Vine   | Bb, Eb, G, F, D, B, E         | whole        | 110      | 100-120   | 4/4   |
|         |         |      | 3        | 2         | 3       | 3         |                             | Tambourine and Castanet phase rhythms   | scraping, rattling, bright, fast, long varying rhythm motifs, complex - textural backing by prepared techniques, heavily generative, quite rapid patterns   | Rosie Bergoni, JBDJJ, Keir Vine                               | Non-tonal                     | 1000-10,000  | 110      | 100-120   | 7/4   |
|         |         |      | 2        | 2         | 3       | 1         |                             | Soprano Sax & Cello quartet   | short rhythmic breath like patterns, layered, tonal, simple quiet melody on clarinet above - mid range pitch-wise   | Charly Richardson, Peter Gregson                              | [G], C, D, A, B, E, F#        | 1000-7,000   | 115      | 105-125   | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Glass Harmonica duet  | based on weavers, textural, synthetic   | James Bulley  | Ab, B, Eb, C, E, Gb           | 2,500-10,000 | 120      | 110-130   | 4/4   |
|         |         |      | 3        |           | 2       | 2         |                             | Double-stopped violin and extended techniques including glissando and harmonics         | double stopped, dragged out light motifs, scatty, extended techniques, harmonics, ghost notes, scrapes  | Simon   | [D], F#, A, E, G, B, C#       | 196-4,400    | 95       | 85-105    | 4/4   |
|         |         |      | 3        | 3         | 3       | 1         |                             | Double-stopped cello and extended techniques including glissando and harmonics          | Slides, glass   | Peter Gregson   | [C], A, E, G, B               | 100-4,000    | 90       | 80-100    | 4/4   |
|         |         |      |          |           |         | 1         |                             | Cello   | double base harmonics, dragged gritty notes sustained, lower / rarely extended techniques, low any sounds etc & harmonics - low pitch range for breath  | Peter Gregson   | [C], E, G, A, B               | 100-4,000    | 90       | 90        | 4/4   |
|         |         |      | 3        |           | 3       | 2         |                             | Peter Gregson   | extended techniques, reed flutes, melodic drive, guttural low end of the oboe   | Cello   | [Bb], Db, F, C, Eb, Gb, A     | 100-4,000    | 100      | 90-110    | 3/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Concert flute duet, short descending melodies and arpeggiated sequences                 | spectrally composed - short melodies on flute, processed live, ready, addition of breathy textures, spectral composition - short melodies on flute, processed live, ready, addition of breathy textures, nervous, timbral, spectral | Katie English   | [D], G, A, E, C               | >            | 100      | 90-110    | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Short clarinet motifs, rapid trills and short melodies                                  |   | Charly Richardson   | [Eb], G, Bb, Ab, C, D, F      | >            | 100      | 90-110    | 4/4   |
|         |         |      | 3        | 2         | 3       | 3         |                             | Arabic influenced legato flute melodies   |   | Katie English   | [A], B, C, E, F, G, D         | >            | 100      | 90-110    | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Cello trills, extended techniques, rapid melodic motifs                                 |   | Peter Gregson   | [Bb], Db, F, Eb, Gb, A, C     | >            | 110      | 100-120   | 4/4   |
|         |         |      | 3        | 3         | 3       | 3         |                             | Soprano Saxophone melodies and rhythms  |   | Charly Richardson   | [F#], B, C#, F, G#, A#, D#,   | >            | 100      | 90-110    | 4/4   |
|         |         |      | 3        | 3         | 3       | 3         |                             | Ascending and descending violin melodies with counterpoint                              |   | Simon Hewitt Jones  | [G], D, F#, A, B, C, E, F,    | >            | 100      | 90-110    | 4/4   |
|         |         |      | 3        |           |         |           |                             | Tuba, Euphonium   | spectrally composed, textural - extended techniques on both instruments, overblows, breath timbres, sung notes etc.   | David Aird, Hywel Jones                                       | [Bb], C, D, Eb, F, G, A       | >            | 110      | 100-120   | 4/4   |
|         |         |      | 3        | 3         | 3       | 3         |                             | Base Flute melodies and counterpoints   | spectrally composed, textural - extended techniques on both instruments, overblows, breath timbres, sung notes etc.   | Katie English   | [Bb], D, C, Eb, F, G, A       | >            | 95       | 85-105    | 4/4   |
|         |         |      | 3        | 3         | 3       | 3         |                             | Clarinet quartet with tuba and euphonium  | rummy overture overture or rumba - tonal harmonic, but dampened (bassoon) practice pedal, prepared slightly? very light dipping short melodic   | Hywel Jones, David Aird, Charly Richardson                    | [Bb], F, A, Eb, G, C          | 500-4,000    | 100      | 80-100    | 4/4   |
|         |         |      | 3        |           | 3       | 3         | Lesser Spotted is very rare | Rapid marimba rhythms, with cabasa counterpoint on the off-beat                         | Not mapped off woodpecker rhythms, but a much griller textural version built from 4-5 layers of interlocking rhythms  | Keir Vine   | D#, G#, A#, C,                | 500-4,000    | 110      | 100-120   | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Extended techniques on the harmonium, mechanical percussive sounds and pedal wheezing   | Extended techniques   | Keir Vine   | Non-tonal                     | 100-5,000    | 110      | 100-120   | 4/4   |
|         |         |      | 1        |           | 3       | 3         |                             | Flute melodies with faster longed trills and rhythmic extended techniques on flute keys | Sax, plaintif, similar to messian's oration. A play on the cuckoo's call - slow ponderous... possible duet with cello chords?   | Katie English   | [C#], G#, E, D#, F#, A, B, C  | 800-1400     | 95       | 85-105    | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Accordion   | Whizzing... grabbed chords, half melodies, creak - extended techniques  | James Bulley  | ?                             | 100-8,000    | 110      | 100-120   | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Harmonica   | moff led  | Theo Lampert-Crook  | ? A, C, D, F                  | 100-8,000    | 100      | 90-110    | 4/4   |
|         |         |      | 3        |           | 3       | 3         |                             | Melodica  | Minor   | Theo Lampert-Crook  | [C], D, Eb, F, G, Ab, Bb      | 100-8,000    | 110      | 100-120   | 3/4   |
|         |         |      | 3        |           |         |           |                             | Trombone  | Sung & played notes (extended techniques).  | Hywel Jones   | Bb, F, D, A                   | 100-8,000    | 105      | 95-115    | 4/4   |

10.4 Excerpt from *Living Symphonies* full organism survey, 2014

[This taxonomy details every living organism (in genus groups) and its related music across all four sites of the 2014 tour of *Living Symphonies*]

10.6. SHARING OF DATA

The sharing of the data that underpins *Living Symphonies* has been a complex and near impossible task. Whilst the partner organisations did create a toolkit that explored the touring of the piece (which was a prerequisite of the Arts Council funding that the piece obtained), it has not been possible to make available the vast majority of the above data in any coherent way. It is clear that most of this data would be very useful to many other researchers and artists (as proven by the interest of numerous academics, musicians and ecologists). However, in order to achieve this there would need to be funding allocated to provide the time for the adequate preparation of the datasets with related material to explain and contextualise them. Some of the photography and video has been used to make short reference films and to provide visual context to document the occurrence of the work, but it has not been possible for the artists to make the following datasets available due to a lack of funding, time constraints surrounding its curation and contextualization, i.e. ranges of data and editing of documentation material, and issues in hosting such large quantities of material. Bracketed after these datasets are the avenues that the artists would hope and plan to make the material available through if possible:

- *forest survey data* (Goldsmiths Data Repository – data.gold.ac.uk, livingsymphonies.com)
- *field recordings* (Goldsmiths Data Repository – data.gold.ac.uk, freesound.org)
- *weather datasets* (Goldsmiths Data Repository – data.gold.ac.uk, livingsymphonies.com)
- *photography* (Goldsmiths Data Repository – data.gold.ac.uk, flickr.com)
- *film* (Goldsmiths Data Repository – data.gold.ac.uk, livingsymphonies.com)
- *custom unique software* (Goldsmiths Data Repository – data.gold.ac.uk, github)
- *sound score materials* (Goldsmiths Data Repository – data.gold.ac.uk, freesound.org)

10.7. CONCLUSION

Whilst much discussion has occurred in recent years surrounding research data management in the context of science-centred and text-based research outputs, very little of this has involved confronting the problems facing artist-researchers working outside these areas. As a result of fundamental differences in the commissioning and funding structures for art projects, there is insufficient funding and understanding on the part of the artists and institutions involved as to how or even why it is worth making this data available. *Living Symphonies* provides a case study that highlights a large and wide-ranging array of datasets that would undoubtedly be useful for researchers across numerous disciplines. In this instance the artists/ researchers are comfortable with the vast majority of the data being made available under one of the more openly accessible of Creative Commons licenses – in this instance this would not affect any further income for the artists as the pieces in themselves are unrepeatable due to their site-specific nature. The artists believe this would be the right thing to do, given the publicly funded nature of the project. This data will remain unavailable unless there is adequate funding and planning from the outset for projects such as these.



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